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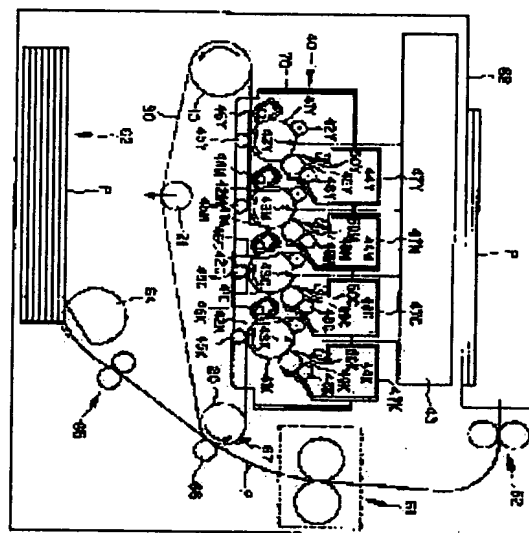
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## (54) COLOR IMAGE FORMING DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To attain the improvement of maintainability and the reduction of a running cost by integrating several image carriers into a cartridge and making a developing means attachable/detachable to/from it.

**SOLUTION:** In the color image forming device of a tandem system provided with at least two or more image forming stations in which electrifying means 42 (K, C, M and Y), the developing means and a transfer means 45 (K, C, M and Y) are arranged on the periphery of the image carrier and to form a color image by making a transfer medium pass through each station, several image carriers 41 (K, C, M and Y) are mutually positioned and attached to an image carrier cartridge 40 attachable/detachable to/from a device main body, and developing means 44 (K, C, M and Y) are constituted so as to be attachable/detachable to/from the image carriers 41 (K, C, M and Y) attached to the image carrier cartridge 40.



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**CLAIMS**

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[Claim(s)]

- [Claim 1] When at least two or more image formation stations which allotted the electrification means, the development means, and the imprint means are established in the perimeter of image support and a transfer medium passes through each station In the color picture formation equipment of the tandem system which performs color picture formation Color picture formation equipment characterized by constituting the development means removable to each image support which two or more image support is mutually positioned to a removable image support cartridge to the body of equipment, is attached, and was attached in said image support cartridge.
- [Claim 2] Color picture formation equipment according to claim 1 characterized by the developer of said development means consisting of a 1 component developer.
- [Claim 3] Color picture formation equipment according to claim 1 or 2 characterized by arranging separately two or more development cartridges which two or more image support is positioned mutually, is attached in one to said image support cartridge, and constitute the development means against said two or more image support of each to said image support cartridge removable.
- [Claim 4] Color picture formation equipment according to claim 1 or 2 characterized by arranging the development cartridge which two or more image support is positioned mutually, is attached in one to said image support cartridge, and unified all the development means against said two or more image support of each to said image support cartridge removable.
- [Claim 5] Two or more image support is positioned mutually, and is attached in one to said image support cartridge, and said image support cartridge is received. The development means against one specific image support in said two or more image support is constituted as one development cartridge. Color picture formation equipment according to claim 1 or 2 characterized by unifying all the development means against the remaining image support of each, being constituted as another development cartridge, and arranging the two aforementioned development cartridges removable separately.
- [Claim 6] Color picture formation equipment of five given in any 1 term from claim 1 characterized by being constituted so that driving force with the development means against said two or more image support and said two or more images support of each may be received from the body of equipment by one place, the driving force for said two or more image support may be branched within said image support cartridge and a transfer drive may be carried out at said development means.
- [Claim 7] Color picture formation equipment according to claim 6 characterized by performing mutual transfer of the driving force between said two or more image support through the gear train, a belt, or a chain.
- [Claim 8] Color picture formation equipment of five given in any 1 term from claim 1 characterized by receiving the driving force of two or more of said image support, receiving the driving force of the development means against said two or more image support of each from another driving source of the body of equipment, and consisting of one driving source of the body of equipment like.
- [Claim 9] Color picture formation equipment of eight given in any 1 term from claim 1 characterized by establishing the device in which adjust the location to other image support of at least one image support attached in said image support cartridge, and a color gap is adjusted.
- [Claim 10] Color picture formation equipment of nine given in any 1 term from claim 1 characterized by not arranging a cleaning means to collect residual developers independently, around the image support of said image support cartridge.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention -- color picture formation equipment -- being related -- especially -- the color picture formation equipment of a tandem system -- setting -- two or more photo conductors -- a cartridge ---izing -- attachment and detachment -- it is related with the color picture formation equipment which made it exchangeable and aimed at improvement in maintenance nature.

[0002]

[Description of the Prior Art] Generally the toner image formation means of an electrophotography method The photo conductor as image support which has a sensitization layer in a peripheral face, and an electrification means to electrify the peripheral face of this photo conductor uniformly, It has an exposure means to expose alternatively the peripheral face uniformly electrified by this electrification means, and to form an electrostatic latent image, and the development means which gives the toner which is a developer to the electrostatic latent image formed by this exposure means, and is used as a visible image (toner image).

[0003] moreover, as image formation equipment of the tandem system which forms a color picture In the above toner image formation means, a middle imprint belt (an example of an imprint belt) is received. More than one (for example, four pieces) are arranged, and the toner image on the photo conductor by these monochrome toner image formation means is imprinted to a middle imprint belt one by one. On a middle imprint belt Two or more colors The middle imprint belt format which piles up the toner image of for example, (yellow, cyanogen, a Magenta, and black (black)), and obtains a color picture on a middle imprint belt Maintenance conveyance of the record medium (for example, form) is carried out at a record-medium maintenance belt (an example of an imprint belt). The conveyance belt format which imprints the toner image by two or more monochrome toner image formation means to a record medium one by one, piles up the toner image of two or more colors on a record medium, and obtains a color picture on a record medium is known.

[0004] By proposing image formation equipment with the unit removable from a body which carried out unitization of the process means arranged to image support and its perimeter, such as electrification and development, constituted them possible [ connection of each unit ], and connected them in JP,62-141574,A as a conventional example of the image formation equipment of such a tandem system, and making each unit removable separately, only an unusable cartridge can do exchange \*\*\*\*\* and is economical.

[0005] Moreover, in JP,3-238467,A, each process unit which has a development means and image support is supported to one support plate, the image formation equipment made removable is proposed, and since each imaging unit can be taken out altogether at once, maintenance nature improves.

[0006] Moreover, the thing of JP,9-160471,A is what unified the process unit except black and was made exchangeable, decreases the exchange frequency of the process section and makes management of an article of consumption easy.

[0007] Furthermore, the thing of JP,9-304994,A supports two or more image support in one, in the example, it is unifying also including a development means, the location precision of the image support in the main frame improves, a color gap is canceled, and maintenance nature does not have fear of \*\*\*\*\* and incorrect insertion.

[0008] Moreover, the thing of JP,11-174772,A can prepare the supporter material which positions the both ends of each image formation member to a position, and can suppress a location gap of each image formation member to the minimum.

[0009]

[Problem(s) to be Solved by the Invention] Generally, in the image formation equipment which gives a toner

from a development means and is visualized to the electrostatic latent image on image support, the lives of image support and a development means differ greatly. In order to carry out thin layer regulation of the developer on a developing roller especially in the case of the image formation equipment using the developer of one component, it is necessary to force a regulation blade on a developing roller by the Takani pile. Then, a developing roller and a regulation blade will be worn out by both friction, and a life will become short inevitably compared with image support. For this reason, by the method of the above-mentioned conventional example which exchanges image support and a development means for coincidence, a life will be governed by the development means, will be exchanged, without involving image support also usable yet, and have the problem that a running cost becomes high. Especially image support is formed into cleaner loess, by this method, since the member worn out in image support is lost, image support serves as a high life, the difference of the life of image support and a development means becomes especially large, and the demand made to exchange only a development means has been increasing in recent years.

[0010] Moreover, in order to have two or more image support in the case of a tandem system, it depends for the precision of color matching of each color on the location and configuration of image support greatly. When image support is exchanged, it is before and after exchange, and since it is difficult to make the location and configuration of image support completely in agreement, the activity for color matching is needed after exchange. In the above-mentioned conventional example, since image support is exchanged with a development means, the activity of color matching is frequently needed and it has the problem that working efficiency falls.

[0011] This invention is being made in view of such a trouble of the conventional technique, the purpose's really cartridge-izing two or more image support of the color picture formation equipment of a tandem system, making removable the development means against each image support to the cartridge, and aiming at improvement in maintenance nature, and reduction of a running cost.

[0012]

[Means for Solving the Problem] The color picture formation equipment of this invention which attains the above-mentioned purpose When at least two or more image formation stations which allotted the electrification means, the development means, and the imprint means are established in the perimeter of image support and a transfer medium passes through each station In the color picture formation equipment of the tandem system which performs color picture formation It is characterized by constituting the development means removable to each image support which two or more image support is mutually positioned to a removable image support cartridge to the body of equipment, is attached, and was attached in said image support cartridge.

[0013] The color picture formation equipment of this invention is suitable when the developer of a development means consists of a 1 component developer.

[0014] Moreover, two or more image support is positioned mutually, and is attached in one to the image support cartridge, and an image support cartridge is received. Even if two or more development cartridges which constitute the development means against two or more image support of each are arranged removable separately Even if the development cartridge which unified all the development means against two or more image support of each is arranged removable Moreover, the development means against one specific image support in two or more image support is constituted as one development cartridge. All the development means against the remaining image support of each may be unified, it may be constituted as another development cartridge, and the two development cartridges may be arranged removable separately.

[0015] moreover, the thing constituted so that driving force with the development means against two or more image support and two or more image support of each may be received from the body of equipment by one place, the driving force for two or more image support may be branched within an image support cartridge and a transfer drive may be carried out at a development means -- things are desirable.

[0016] In that case, it is desirable to perform mutual transfer of the driving force between two or more image support through the gear train, a belt, or a chain.

[0017] Moreover, from one driving source of the body of equipment, the driving force of two or more image support is received, and the driving force of the development means against two or more image support of each is received, and you may consist of another driving sources of the body of equipment like.

[0018] Moreover, it is desirable to establish the device in which adjust the location to other image support of at least one image support attached in the image support cartridge, and a color gap is adjusted.

[0019] Moreover, around the image support of an image support cartridge, a cleaning means to collect residual developers independently may not be arranged.

[0020] In this invention, since the development means is constituted removable to each image support which two or more image support is mutually positioned to a removable image support cartridge to the body of equipment, is attached as mentioned above, and was attached in the image support cartridge, the relative-position precision between image support can improve, and the color gap resulting from a location gap of image support or a gap of parallelism can be prevented. Moreover, since two or more image support is exchangeable for coincidence, maintenance nature improves. Furthermore, even when a development means and an image support cartridge become exchangeable independently, a development means becomes a life and it exchanges, it is not necessary to exchange image support and a running cost can be reduced. Moreover, since it becomes exchange of only a development means even if a development means reaches and exchanges for a life, there is no need for the activity of color matching depending on the location and configuration of image support, and it becomes color picture formation equipment with sufficient working efficiency. Furthermore, in order for what is necessary to be just to detach and attach to an image support cartridge at the time of exchange of a development means after taking out an image support cartridge from the body of equipment, exchange of a development means becomes easy and maintenance nature improves.

[0021]

[Embodiment of the Invention] Hereafter, the color picture formation equipment of this invention is explained based on an example.

[0022] The front view showing the outline configuration of the whole color picture formation equipment of one example which applies this invention to drawing 1 is shown. As shown in drawing 1, with a driving roller 10, the follower roller 20, and a tension roller 21, this image formation equipment adds a tension, is laid, it has the middle imprint belt 30 by which a circulation drive is carried out in the direction of an illustration arrow head (counterclockwise rotation), and the photo conductors (photoconductor drum) 41K, 41C, 41M, and 41Y which have a sensitization layer in the peripheral face as four image support arranged at intervals of predetermined to this middle imprint belt 30 are arranged. K, C, M, and Y which were added after the sign mean black, cyanogen, a Magenta, and yellow, respectively, and it is shown, respectively that it is a photo conductor for black, cyanogen, a Magenta, and yellow. The same is said of other members. Although the rotation drive of the photo conductors 41K, 41C, 41M, and 41Y is carried out in the direction of an illustration arrow head (clockwise rotation) synchronizing with the drive of the middle imprint belt 30. Around each photo conductor 41 (K, C, M, Y) The corona-electrical-charging machine 42 (K, C, M, Y) which consists of scorotron as an electrification means which electrifies uniformly the peripheral face of a photo conductor 41 (K, C, M, Y), respectively, The exposure location 43 (K, C, M, Y) which exposes alternatively the peripheral face uniformly electrified with this corona-electrical-charging vessel 42 (K, C, M, Y) for every color with the exposure light from the exposure unit 43, and forms an electrostatic latent image, The developer 44 (K, C, M, Y) which gives the toner which is a developer to the electrostatic latent image formed in this exposure location 43 (K, C, M, Y), and is used as a visible image (toner image), The primary imprint roller 45 (K, C, M, Y) as an imprint means which carries out the sequential imprint of the toner image developed with this developer 44 (K, C, M, Y) at the middle imprint belt 30 which is a candidate for a primary imprint, After imprinting, it has cleaning equipment 46 (K, C, M, Y) as a cleaning means to remove the toner which remains on the front face of a photo conductor 41 (K, C, M, Y).

[0023] A developer 44 (K, C, M, Y) is what uses for example, nonmagnetic monocomponent toner as a developer. It is respectively constituted as a development cartridge 47 (K, C, M, Y) (drawing 4). such a 1 component developer stored into it -- a feed roller 48 (K --) C, M, and Y -- a developing roller 49 (K, C, M, Y) -- conveying -- a developing roller 49 (K --) the thickness of the developer adhering to C, M, and Y front face -- the regulation blade 50 (K --) It regulates by C, M, and Y and negatives are developed as a \*\* toner image by carrying out contact or \*\* thickness of the developing roller 49 (K, C, M, Y) to a photo conductor 41 (K, C, M, Y), and making a developer adhere according to the potential level of a photo conductor 41 (K, C, M, Y).

[0024] The black formed of the monochrome toner image formation station of such four colors, cyanogen, a Magenta, and each toner image of yellow The primary imprint bias impressed to the primary imprint roller 45 (K, C, M, Y) imprints primarily one by one on the middle imprint belt 30. The toner image which piled up one by one on the middle imprint belt 30, and became full color the fixing roller pair which the record media P, such as a form, imprint secondarily in the secondary imprint roller 66, and is the fixing section -- it is established on a record medium P by passing along 61, and is discharged by 62 on the delivery roller pair paper output tray 68 formed in the equipment upper part.

[0025] the inside of drawing 1 and 63 -- many -- the sheet paper cassette by which laminating maintenance of the record medium P of several sheets is carried out -- [ in addition, ] The pickup roller with which 64

feeds with one record medium P at a time from a sheet paper cassette 63, The gate roller pair as which 65 specifies the supply timing of the record medium P to the secondary imprint section of the secondary imprint roller 66, The secondary imprint roller as a secondary imprint means by which 66 forms the secondary imprint section between the middle imprint belts 30, and 67 are the cleaning blades as a cleaning means to remove the toner which remains on the front face of the middle imprint belt 30 after a secondary imprint.

[0026] Here, developer 44K of black depend most the color which the color in which fogging is conspicuous is black, and is not most conspicuous on it being yellow at it, when it is imprinted by the circulation direction maximum upstream of the middle imprint belt 30 on a record medium P that developer 44Y of yellow is arranged by the lowest style side. namely, reversal development etc. -- setting -- fogging -- a developer -- usually -- \*\*\*\* -- although caused by the toner charged to antipole nature, the black toner with which fogging is most conspicuous is first imprinted as a layer of the bottom on the middle imprint belt 30, and since the toner which causes fogging in it continues adhering to the middle imprint belt 30 firmly in an image-force etc., it is hard to imprint on a record medium P in the secondary imprint section. On the other hand, although the toner which causes fogging of yellow which is not most conspicuous has adhered as a layer of the top on the middle imprint belt 30 and it moves on a record medium P easily, it is seldom conspicuous. Fogging stops namely, being not much conspicuous as the whole, as a result of the yellow toner with which a black toner stops being able to move from the color in which fogging is most conspicuous by taking the above arrangement easily relatively on a record medium P, and fogging is not most conspicuous becoming easy to move relatively on a record medium P.

[0027] Moreover, since 1 component developers, such as nonmagnetic monocomponent toner, are used as a developer, the volume of the \*\*\*\* developer 44 (K, C, M, Y) which does not need to use a carrier like a two component developer becomes small, and small color picture formation equipment can be constituted.

[0028] Now, in this invention, it sets to the above color picture formation equipments. The corona-electrical-charging machine 42 (K, C, M, Y) arranged to four photo conductors 41K, 41C, 41M, and 41Y and perimeters as shown in drawing 1 and drawing 2, Cleaning equipment 46 (K, C, M, Y) is pulled out and removed from the body of equipment as a photo conductor cartridge 40 of one, and the body of equipment is equipped, and installation is made possible. In this case, the developers 44K, 44C, 44M, and 44Y attached to each photo conductors 41K, 41C, 41M, and 41Y are made removable to the photo conductor cartridge 40.

[0029] When drawing 2 is made reference, namely, on the frame 70 of the photo conductor cartridge 40 Four photo conductors 41K, 41C, 41M, and 41Y and the corona-electrical-charging machine 42 (K, C, M, Y) attached to them, Cleaning equipment 46 (K, C, M, Y) is positioned relatively, and is attached, and it is withdrawal from the body of equipment by once raising like the duplex arrow head in drawing, and sliding to a degree. for this reason, a fixing roller pair -- 61 and a delivery roller pair -- 62 is attached in the side plate 69 which can circle to the center of rotation and this alignment of the follower roller 20 -- having -- \*\*\*\* -- a fixing roller pair -- 61 and a delivery roller pair -- withdrawal opening is formed out of equipment in the photo conductor cartridge 40 by evacuating 62. Thus, where the photo conductor cartridge 40 is pulled out from the body of equipment, it has isolated from the middle imprint belt 30, and a photo conductor 41 (K, C, M, Y) can remove the photo conductor cartridge 40 from equipment, and is as exchangeable as the new photo conductor cartridge 40.

[0030] Drawing 3 is the perspective view of photo conductor cartridge 40 simple substance in the condition of having removed Developers 44K, 44C, 44M, and 44Y. As for drawing 4, the photo conductor cartridge 40 is equipped with Developers 44K, 44C, and 44M. Are the perspective view showing whether a developer removes 44Y and signs that it equips, and the frame 70 is carrying out the rectangular side plate configuration. Four photo conductors 41K, 41C, 41M, and 41Y are mutually attached pivotable with Shafts 71K, 71C, 71M, and 71Y at the predetermined spacing between the both-sides plates of the frame 70 of the rectangle parallel, respectively. Gearings 72K, 72C, 72M, and 72Y are attached in the end of the shaft 71 (K, C, M, Y) of each photo conductor 41 (K, C, M, Y), respectively, and through the gear train which carries out a postscript, each photo conductor 41 (K, C, M, Y) synchronizes at the same rate, and is constituted pivotable in the direction of an arrow head of drawing 1 (clockwise rotation).

[0031] moreover -- between the same both-sides plates of a frame 70 -- each photo conductor 41 (K, C, and M --) The corona-electrical-charging machine 42 (K, C, M, Y) and cleaning equipment 46 (K, C, M, Y) (in drawing 3, it hides and is not visible to a photo conductor 41 (K, C, M, Y) and a frame 70.) belonging to Y) it attaches in a predetermined location -- having -- \*\*\*\* -- each corona-electrical-charging machine 42 (K and C --) the electrode 75 (K --) which impresses the high voltage to the discharge wire of the scorotron of M and Y the electrode 76 (K --) which impresses the high voltage to the shot of C, M, Y, and its scorotron

Where C, M, and Y were prepared in one side face of the side plate of a frame 70 and the photo conductor cartridge 40 is equipped with each developer 44 (K, C, M, Y) The electrode 77 (K, C, M, Y) which impresses development bias voltage to the developing roller 49 (K, C, M, Y) of each developer 44 (K, C, M, Y), The electrode 78 (K, C, M, Y) which impresses development supply bias voltage to a feed roller 48 (K, C, M, Y) is similarly formed in one side face of the side plate of a frame 70. On that same side plate, moreover, the manufacturing information of this photo conductor cartridge 40, Where IC110 as a storage means by which busy condition information, color gap information, etc. were made to memorize is also attached and the body of equipment is equipped with the photo conductor cartridge 40 These electrodes 75 (K, C, M, Y), an electrode 76 (K, C, M, Y), an electrode 77 (K, C, M, Y), an electrode 78 (K, C, M, Y), and IC110 are automatically connected to the power circuit of the body of equipment, and a control circuit. Moreover, in order that the shaft 71 (K, C, M, Y) of each photo conductor 41 (K, C, M, Y) may also take a ground, it connects with a ground automatically in the condition.

[0032] moreover, in the inside upper part of the same both-sides plate of a frame 70 the fixed location corresponding to each photo conductor 41 (K, C, M, Y) -- a developer 44 (K --) The guide slot 73 (K, C, M, Y) for accepting C, M, and Y is arranged. Moreover, since each developer 44 (K, C, M, Y) received along the guide slot 73 (K, C, M, Y) is fixed, the fixed lever 74 (K, C, M, Y) attached possible [ revolution ] is formed. moreover, in the both-sides side of the development cartridge 47 (K, C, M, Y) of each developer 44 (K, C, M, Y) The guide projection 79 (K, C, M, Y) inserted in the guide slot 73 (K, C, M, Y) from the up open end of each guide slot 73 (K, C, M, Y) is attached (in drawing 4 , only guide projection 79Y of one side of development cartridge 47Y is visible.). In order to attach the developer 44 (K, C, M, Y) which corresponds to each photo conductor 41 (K, C, M, Y) What is necessary is to insert the guide projection 79 (K, C, M, Y) in the corresponding guide slot 73 (K, C, M, Y) from Kami, to make it circle and just to make the fixed lever 74 (K, C, M, Y) fix after that. What is necessary is to make it circle conversely, to remove the fixed lever 74 (K, C, M, Y) of a location which removes, and just to extract the development cartridge 47 (K, C, M, Y) upwards along the guide slot 73 (K, C, M, Y), in order to remove each development cartridge 47 (K, C, M, Y) for exchange etc.

[0033] Since the development cartridge 47 (K, C, M, Y) which constitutes each developer 44 (K, C, M, Y) to each photo conductor 41 (K, C, M, Y) can be separately detached and attached in the example of this drawing 4 Only the developer 44 (K, C, M, Y) which reached the life can become exchangeable, and exchanging vainly the remaining developers 44 (K, C, M, Y) can be lost, therefore a running cost can be reduced.

[0034] Drawing 5 is a perspective view for explaining the attachment-and-detachment device at the time of constituting black, cyanogen, a Magenta, and four developers 44 (K, C, M, Y) of yellow as a development cartridge 47 of one to the above photo conductor cartridges 40. In this case, only the guide slot 73 on the pair is established in the inside upper part of the both-sides plate of the frame 70 of the photo conductor cartridge 40 between both-sides plates, and only the fixed lever 74 which can circle in the pair corresponding to it is formed in it. On the other hand, it is unified and four developers 44 (K, C, M, Y) are constituted as one development cartridge 47. In the both-sides side of the development cartridge 47 The guide projection 79 inserted in the guide slot 73 from the up open end of the guide slot 73 is attached (in drawing 5 , only the guide projection 79 of one side is not visible.). What is necessary is to insert the guide projection 79 in the guide slot 73 from Kami, to make it circle and just to make the fixed lever 74 fix after that, in order to attach this development cartridge 47 in the photo conductor cartridge 40. What is necessary is to make it circle conversely, to remove the fixed lever 74, and just to extract the development cartridge 47 upwards along the guide slot 73, in order to remove the development cartridge 47 for exchange etc.

[0035] In the example of this drawing 5 , there is a merit which maintenance nature can be raised or can avoid risk of incorrect wearing by lessening the number of articles of consumption for the developer 44 (K, C, M, Y) of K, C, M, and Y4 color as a development cartridge 47 of one.

[0036] the photo conductor cartridges 40 with above drawing 6 -- receiving -- developer 44K of black -- as one development cartridge 47K -- the case of drawing 3 and drawing 4 -- the same -- photo conductor 41K of black -- receiving -- attachment and detachment -- exchangeable -- constituting -- three developers, cyanogen, a Magenta, and yellow, 44 (C, M, Y) -- as development cartridge 47YMC of one -- constituting -- attachment and detachment -- it is a perspective view for explaining the attachment-and-detachment device at the time of constituting exchangeable. In this case, guide slot 73K for accepting development cartridge 47K between both-sides plates and guide slot 73YMC for accepting development cartridge 47YMC are prepared in the inside upper part of the both-sides plate of the frame 70 of the photo conductor cartridge 40, and fixed lever 74K in which the revolution corresponding to them is possible, and 74YMC(s) are prepared



in it. On the other hand, guide projection 79K are attached in the both-sides side of development cartridge 47YMC of 3 color one guide projection 79YMC in the both-sides side of the black photo conductor cartridge 40 (in drawing 6 ). only guide projection 79YMC of one side of development cartridge 47YMC is not visible. What is necessary is to insert guide projection 79K or 79YMC(s) in guide slot 73K or 73YMC (s) from Kami, to make it circle and just to make after that fixed lever 74K or 74YMC(s) fix, in order to attach these development cartridge 47K or 47YMC(s) in the photo conductor cartridge 40. What is necessary is to make it circle conversely, to remove fixed lever 74K or 74YMC(s), and just to extract development cartridge 47K or 47YMC(s) upwards along with guide slot 73K or 73YMC(s), in order to remove development cartridge 47K or 47YMC(s) for exchange etc.

[0037] In the example of this drawing 6 , there is a merit which maintenance nature can be raised or can avoid risk of incorrect wearing by lessening the number of articles of consumption for the developer 44 (C, M, Y) of C, M, and Y3 color as development cartridge 47YMC of one. Moreover, since developer 44K of black with high operating frequency are generally exchangeable as independent development cartridge 47K, there is a merit that whose the developer 44 (C, M, Y) of C, M, and Y3 color is made useless it is lost.

[0038] Next, the device in which the photo conductors 41K, 41C, 41M, and 41Y in the photo conductor cartridge 40 at the time of equipping the body of equipment with the photo conductor cartridge 40 are synchronously rotated so that a color gap may not be caused is explained. drawing 7 shows one configuration for it -- it is -- above -- each photo conductor 41 (K --) Gearing 72K fabricated with the same die by the end of the shaft 71 (K, C, M, Y) of C, M, and Y, respectively, 72C, 72M, and 72Y are attached, three idle wheels 81, 82, and 83 for turning-effort transfer intervene between Gearings 72K, 72C, and 72M and 72Y, and the gear train is constituted. And if one gearing of this gear train and the driver 91 which meshes to gearing 72Y in the example of drawing are arranged at the body side driving source 90 of equipment and the predetermined location of the body of equipment is equipped with the photo conductor cartridge 40, a driver 91 will mesh to gearing 72Y.

[0039] on the other hand -- the developing roller 49 (K and C --) of each developer 44 (K, C, M, Y) At the end of the shaft at M and Y the developing-roller gearing 84 (K, C, M, Y) a feed roller 48 (K, C, M, Y) -- the end of the shaft -- the feed roller gearing 85 (K --) C, M, and Y are fixed, respectively -- having -- each developing-roller gearing 84 (K and C --) between M, Y, and the feed roller gearings 85 (K, C, M, Y) -- an idle wheel 86 (K --) Since C, M, and Y intervene and the developing-roller gearing 84 (K, C, M, Y) meshes with the gearing 72 (K, C, M, Y) of each photo conductor 41 (K, C, M, Y), The rotation drive also of the developing roller 49 (K, C, M, Y) and feed roller 48 (K, C, M, Y) of a developer 44 (K, C, M, Y) which belong to it synchronizing with rotation of each photo conductor 41 (K, C, M, Y) is carried out.

[0040] Since it is such a configuration, by rotating the driver 91 of one driving source 90 by the side of the body of equipment, it can synchronize altogether and the rotation drive of four photo conductors 41 (K, C, M, Y), the developing roller 49 (K, C, M, Y) of the developer 44 (K, C, M, Y) belonging to them, and the feed roller 48 (K, C, M, Y) can be carried out.

[0041] Since the number of a gearing's gearing points that driving force is transmitted at the time of photo conductor cartridge 40 attachment and detachment is one in such a configuration, working efficiency improves at the time of photo conductor cartridge 40 attachment and detachment. Moreover, the high definition image formation equipment which it becomes possible to raise engagement precision, and has neither a color gap nor banding (nonuniformity, such as concentration right-angled to a feed direction) can be offered by using the positioning criteria of the photo conductor cartridge 40 as this driving force transfer gearing 91.

[0042] In addition, it cannot be overemphasized that it is not limited to the gear train like illustration as photo conductors 41K, 41C, and 41M and a turning-effort transfer device in which it synchronized between 41Y, but a belt and a chain may be used.

[0043] Drawing 8 is drawing showing the configuration of the modification of drawing 7 , and drawing 9 is drawing which looked at the rotation transfer section which consists of the gearing 91 of drawing 8 , a gearing 92, a clutch 93, a gearing 94 - a gearing 96 from the top. In this case, the driver 91 of the body side driving source 90 ( drawing 7 ) of equipment meshes to gearing 72K through a gearing 92, and the idle wheel 81 between gearing 72K and gearing 72C is excluded. Instead, if the rotation transfer device which consists of a gearing 92, a clutch 93 and a gearing 94 - a gearing 96 is established between gearing 72K and gearing 72C and a clutch 93 is turned ON as shown in drawing 9 The turning effort a gearing's 92 turning effort with a gearing 94 on propagation, its gearing 94, and the meshing gearing 95 Propagation, Rotation of the same direction as gearing 72K is transmitted to gearing 72C through the gearing 95 and the gearing 96 which intervenes between gearing 72C, and rotation of gearing 72M and gearing 72Y is similarly delivered



the case of drawing 7 . Here, since gearings 92, 94, and 96 are fabricated with the same die, four photo conductors synchronize and a rotation drive is carried out at the same rate.

[0044] When a clutch 93 is turned OFF in this configuration, rotation of a driver 91 is transmitted only to developer 44K of black, and other developers 44 (C, M, Y) stop operating. therefore, when carrying out image formation actuation of only black 1 color Since other photo conductors 41 (C, M, Y) and developers 44 (C, M, Y) without the need of operating effectively only photo conductor 41K of the color and developer 44K, and operating them serve as non-actuation Those unnecessary consumption can be prevented and there is a merit which can develop the life of a developer 44 (C, M, Y).

[0045] Drawing 10 and drawing 11 are drawings for explaining the example which drives the photo conductor 41 (K, C, M, Y) and developer 44 (K, C, M, Y) of the photo conductor cartridge 40 by the separate driving source, when the body of equipment is equipped with the photo conductor cartridge 40, and drawing 10 is the same drawing as drawing 7 . In this example, if the developing-roller gearing 84 (K, C, M, Y) of each developer 44 (K, C, M, Y) meshed with the gearing 72 (K, C, M, Y) of each photo conductor 41 (K, C, M, Y), he did not break, but has dissociated so that more clearly than drawing 10 . Only these points differ about the gear train of the photo conductor cartridge 40. Therefore, as shown in drawing 10 , the rotation drive of the four photo conductors 41 (K, C, M, Y) can be synchronously carried out by rotating the driver 91 of the driving source 90 by the side of the body of equipment. However, depending on the driving force of this driving source 90, the developing roller 49 (K, C, M, Y) and feed roller 48 (K, C, M, Y) of each developer 44 (K, C, M, Y) do not rotate. In the case of this example, as shown in drawing 11 , another location by the side of the body of equipment is equipped with another driving source 100. four gearings 101 (K --) which another driving source 100 synchronizes and rotate in the same direction when the predetermined location of the body of equipment is equipped with the photo conductor cartridge 40 It is arranged so that it may gear with the developing-roller gearing 84 (K, C, M, Y) with which C, M, and Y were fixed to the end of the shaft of the developing roller 49 (K, C, M, Y) of the developer 44 (K, C, M, Y) attached in the photo conductor cartridge 40. Therefore, the rotation drive of the developer 44 (K, C, M, Y) is carried out by the driving source 100 of a photo conductor 41 (K, C, M, Y) and another sequence.

[0046] In arrangement like drawing 1 , although it is greatly dependent on the rotation precision of image support, it does not depend for banding of a color gap of each color or an image on the rotation precision of a developing roller so much. Therefore, by making the driving source 90 of the photo conductor 41 (K, C, M, Y) of the photo conductor cartridge 40, and the driving source 100 of a developer 44 (K, C, M, Y) into another thing like drawing 10 and drawing 11 It can prevent that the effect of the rotation nonuniformity resulting from torque fluctuation of a development means etc. attains to rotation of image support, and high definition image formation equipment without a color gap or image banding can be offered.

[0047] Next, in the above photo conductor cartridges 40, the example of the device in which a mutual location gap of photo conductors 41K, 41C, 41M, and 41Y and the color gap which takes place in case the monochrome toner image of four colors is piled up and imprinted on the middle imprint belt 30 especially by gap (skew) of parallelism are adjusted is shown in drawing 12 . Each is inserted between an adjusting screw 105 and the tip of the expandability spring 106. the shaft 71 (K, C, M, Y) of each photo conductor 41 (K, C, M, Y) which projects from one side plate of a frame 70 like illustration -- By fixing the other end of the expandability spring 106 to a side plate 70, and enabling adjustment of the tip of an adjusting screw 105 to the extended direction and opposite direction of the expandability spring 106 By carrying out centering control of the end of a shaft 71 (K, C, M, Y), a gap of the mutual parallelism of photo conductors 41K, 41C, 41M, and 41Y can be adjusted now. such a color gap adjustment device -- four photo conductors 41K, 41C, 41M, and 41Y -- there is not necessarily no need of preparing in all. Although the same adjustment device also as the edge of the opposite side of each shaft 71 (K, C, M, Y) may be established, in addition, a location [ having maintained the parallelism between photo conductor 41 (K, C, M, Y) ] gap Since it is electrically solvable by adjusting the write-in timing of the latent image of each color formed on each photo conductor 41 (K, C, M, Y), there is not necessarily no need.

[0048] Thus, by preparing the justification device of a photo conductor 41 (K, C, M, Y) in the photo conductor cartridge 40, fine tuning of the latent-image write-in location to a photo conductor 41 (K, C, M, Y) and an imprint location can be attained, and a color gap can be reduced more. In addition, after attaching to the time of shipment of the photo conductor cartridge 40, or the body of equipment, at any time is possible for the color gap adjustment by this color gap (location) adjustment device.

[0049] By the way, toner development of the latent image is formed and carried out on image support, and there is a method called the cleaner loess which is collected with a developer, and which is been and broken in the electrophotography method which imprints a toner image to a transfer medium, without forming

cleaning equipment like drawing 1, although the residual toners with which it does not imprint on image support are collected (for example, JP,6-77166,B). In adopting such a cleaner loess method, the cleaning equipment 46 (K, C, M, Y) of drawing 1 is excluded, and becomes a configuration as shown in drawing 13. Everything but there being no case of 46 (K, C, M, Y) cleaning equipment of drawing 13 like illustration is the same configuration as the case of drawing 1, and explanation of the configuration and an operation is omitted. Moreover, cleaning equipment 46 (K, C, M, Y) does not only exist, four photo conductors 41K, 41C, 41M, and 41Y and the corona-electrical-charging machine 42 (K, C, M, Y) arranged to that perimeter are united, and it is constituted that the configuration of the photo conductor cartridge 40 in this case also differs from the case of drawing 1 and drawing 2.

[0050] thus, by adopting the method which loses cleaning equipment, it not only can make small the photo conductor cartridge 40 and the body of equipment, but Reaction force applied to a photo conductor 41 (K, C, M, Y) with the blade of cleaning equipment etc. can be made small. Deformation of a frame 70 becomes small by that cause, and the color gap produced when a frame 70 deforms and photo conductor 41 (K, C, M, Y) location shifts can be prevented.

[0051] Now, although the above example was an example used as the photo conductor cartridge 40 which unified four photo conductors 41 (K, C, M, Y) based on this invention in the color picture formation equipment of the tandem system which uses the middle imprint belt 30 ( drawing 1 ) In any [ of a more than ] case, a record-medium maintenance belt is used, without [ instead ] using a middle imprint belt. Maintenance conveyance of the record media, such as a form, is carried out with the record-medium maintenance belt, and the toner image of two or more colors with which a sequential imprint is carried out and two or more direct monochrome toner images were piled up on the record medium on the record medium can be applied similarly [ in the case of the established method ]. The example is shown in drawing 14. Record-medium maintenance belt 30' is used for a different point from the case of drawing 1 instead of the middle imprint belt 30 of drawing 1. It is taken up one sheet at a time by the pickup roller 64 from a sheet paper cassette 63. The record medium (form) P to which supply timing was specified by 65 is conveyed by this record-medium maintenance belt 30'. it synchronizes with the electrostatic latent image exposed and formed on each photo conductor 41 (K, C, M, Y) -- as -- a gate roller pair -- the record-medium P top which is conveyed by the record-medium maintenance belt 30', and is -- a photo conductor 41 (K --) the toner image formed on C, M, and Y -- the primary imprint roller 45 (K and C --) The record medium P with which the toner image which was made to carry out a sequential imprint in an operation of M and Y, was set in the sequential pile, and became full color has ridden It is fixed to the toner image which became full color on the record medium P by passing along 61. the fixing roller pair which it exfoliates from record-medium maintenance belt 30' with the exfoliation roller 107, and is the fixing section -- It differs at the point discharged on the delivery roller pair paper output tray 68 formed in the equipment upper part of 62. In addition, especially the configuration of the photo conductor cartridge 40 is the same as that of drawing 1 etc. Probably, it will be clear that it is applicable also to the color picture formation equipment of the tandem system of the method to which any above-mentioned example carries out maintenance conveyance of the record medium, and imprints a toner image on the record medium with a record-medium maintenance belt, without using such a middle imprint belt.

[0052] As mentioned above, the color picture formation equipment of this invention the body of equipment - receiving -- the removable photo conductor cartridge 40 -- receiving -- two or more photo conductors 41 (K --) Since the developer 44 (K, C, M, Y) is constituted removable to each photo conductor 41 (K, C, M, Y) which C, M, and Y are positioned mutually, are attached and was attached in the photo conductor cartridge 40 The relative-position precision between photo conductors can improve, and the color gap resulting from a location gap and skew of a photo conductor can be prevented.

[0053] Moreover, it can become possible to attach a photo conductor gearing to a photo conductor by phase relation by which the velocity turbulence resulting from the gearing (photo conductor gearing) which drives a photo conductor is reduced, and to really constitute a cartridge 40, and the color gap resulting from a photo conductor gearing can be reduced further sharply ( drawing 7 etc.). Since a photo conductor rotates independently when attaching a photo conductor to the body of equipment separately, such a photo conductor gearing's phase adjustment cannot be performed.

[0054] Moreover, it becomes possible to sort out the photo conductor with which the property gathered at the time of shipment, and to finish setting up the photo conductor cartridge 40, and change of the color resulting from dispersion in the photo conductor property of each color can be prevented. Moreover, since two or more photo conductors are exchangeable for coincidence, maintenance nature improves.

[0055] Furthermore, since the developer 44 (K, C, M, Y) was constituted removable to the photo conductor

cartridge 40, even when a developer 44 (K, C, M, Y) and the photo conductor cartridge 40 become exchangeable independently, a developer 44 (K, C, M, Y) becomes a life and it exchanges, it is not necessary to exchange a photo conductor 41 (K, C, M, Y), and a running cost can be reduced.

[0056] Moreover, since it becomes exchange of only a developer 44 (K, C, M, Y) even if a developer 44 (K, C, M, Y) reaches and exchanges for a life, there is no need for the activity of color matching depending on the location and configuration of a photo conductor 41 (K, C, M, Y), and image formation equipment with sufficient working efficiency can be offered.

[0057] Moreover, in order for what is necessary to be just to detach and attach it to the photo conductor cartridge 40 after exchange of a developer 44 (K, C, M, Y) takes out the photo conductor cartridge 40 from the body of equipment, exchange of a developer 44 (K, C, M, Y) becomes easy, and its maintenance nature improves.

[0058] In addition, two or more photo conductors 41 (K, C, M, Y) are used as one substitute part, it can also become possible to also use a developer 44 (K, C, M, Y) as one substitute part 47 ( drawing 5 ), and it can raise maintenance nature sharply.

[0059] As mentioned above, although the color picture formation equipment of this invention has been explained based on an example, this invention is not limited to these examples, but various deformation is possible for it.

[0060]

[Effect of the Invention] According to the color picture formation equipment of this invention, so that clearly from the above explanation Two or more image support is mutually positioned to a removable image support cartridge to the body of equipment, and it is attached. Since the development means is constituted removable to each image support attached in the image support cartridge, the relative-position precision between image support can improve, and the color gap resulting from a location gap of image support or a gap of parallelism can be prevented. Moreover, since two or more image support is exchangeable for coincidence, maintenance nature improves. Furthermore, even when a development means and an image support cartridge become exchangeable independently, a development means becomes a life and it exchanges, it is not necessary to exchange image support and a running cost can be reduced. Moreover, since it becomes exchange of only a development means even if a development means reaches and exchanges for a life, there is no need for the activity of color matching depending on the location and configuration of image support, and it becomes color picture formation equipment with sufficient working efficiency. Furthermore, in order for what is necessary to be just to detach and attach to an image support cartridge at the time of exchange of a development means after taking out an image support cartridge from the body of equipment, exchange of a development means becomes easy and maintenance nature improves.

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[Translation done.]

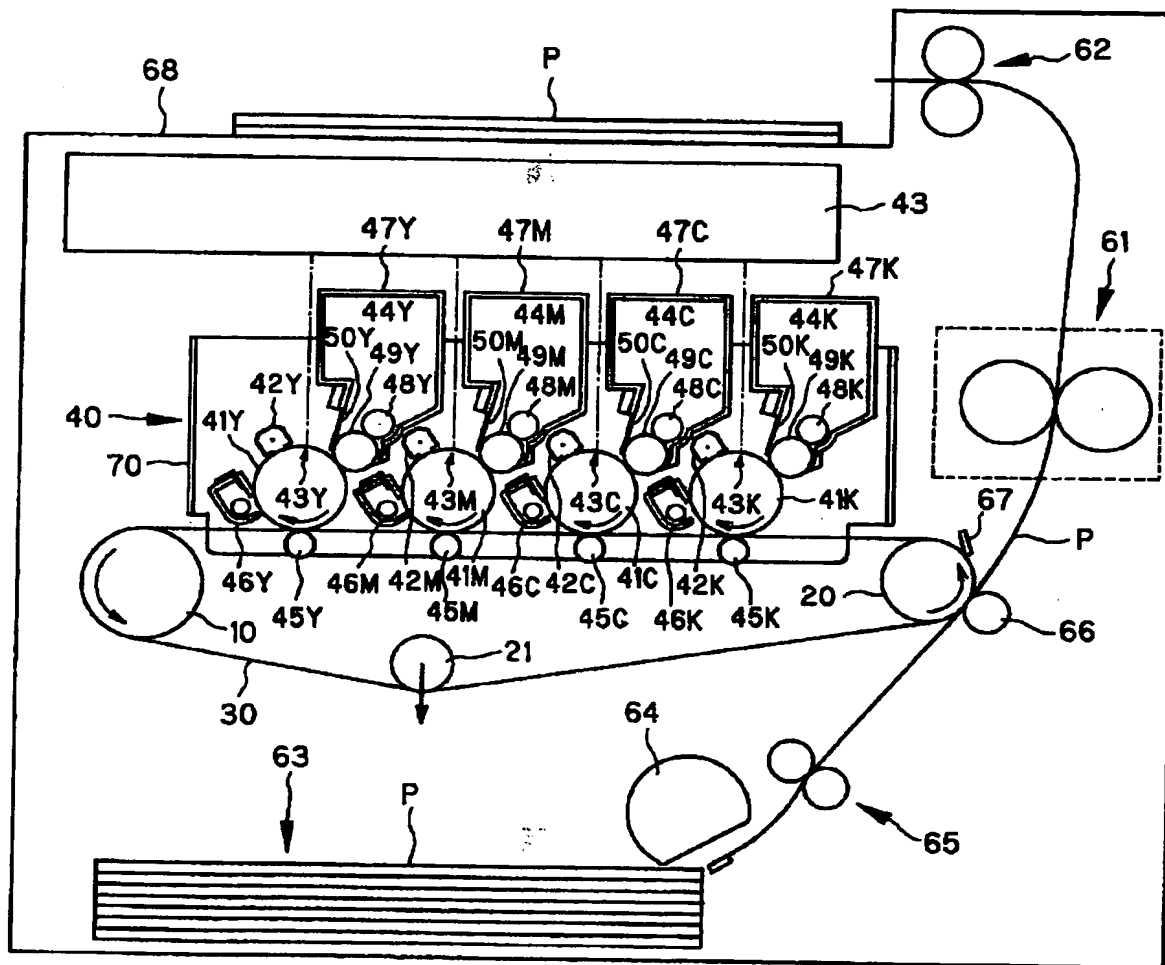
## \* NOTICES \*

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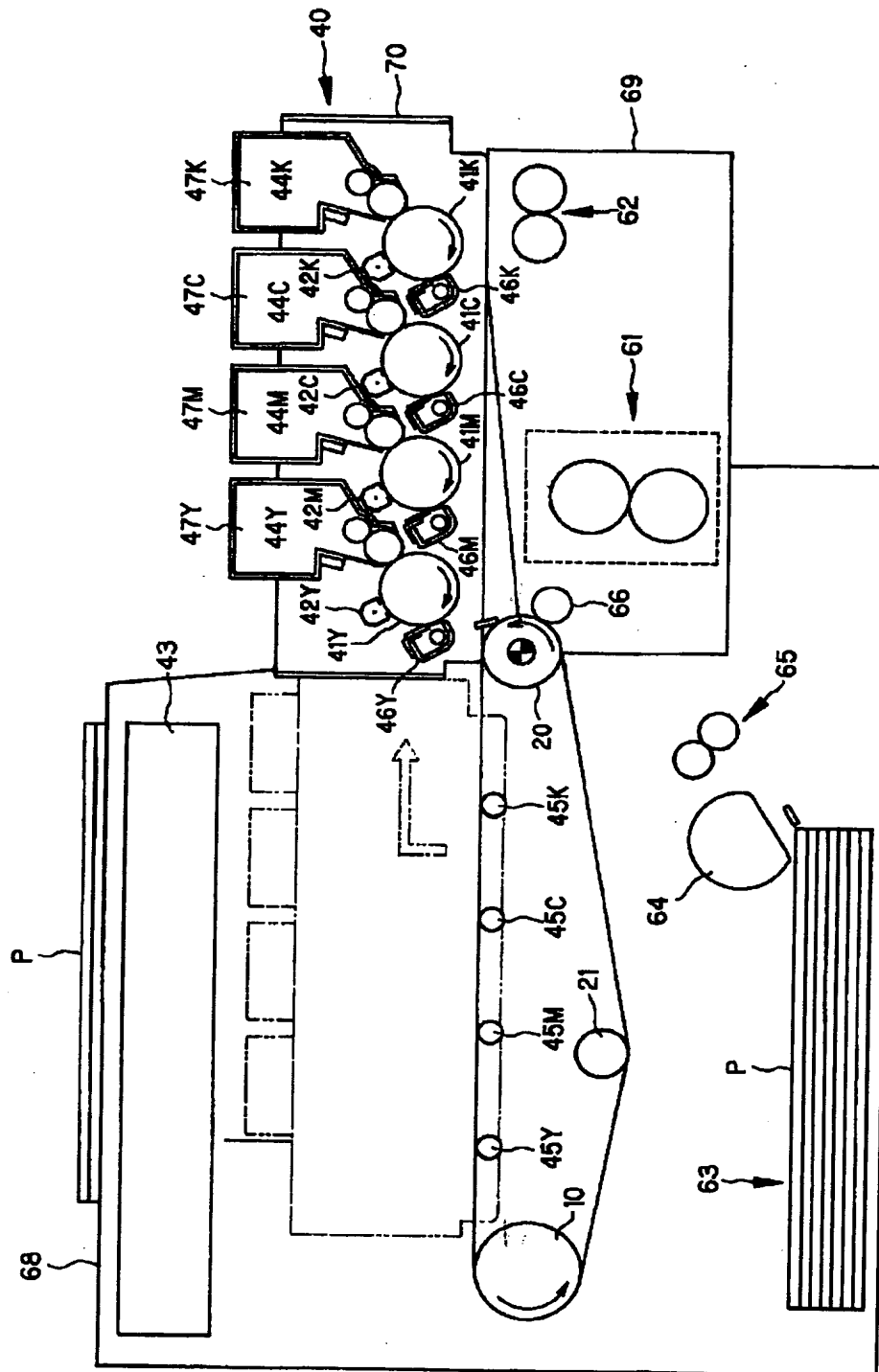
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

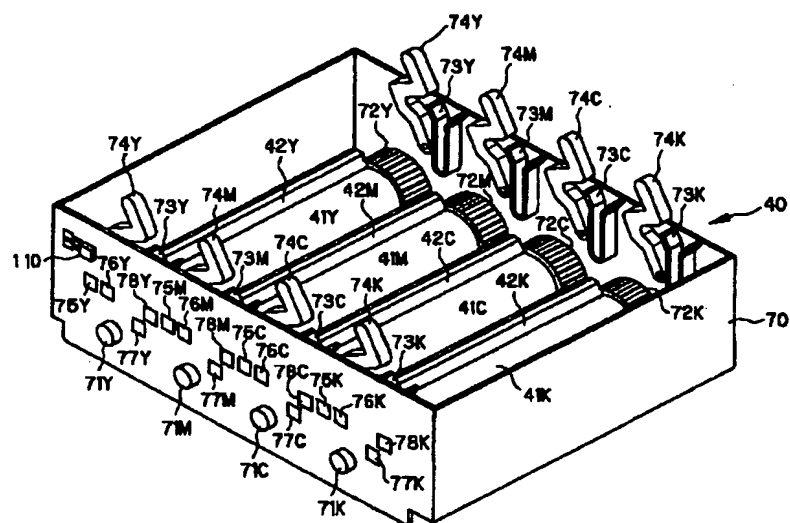
[Drawing 1]



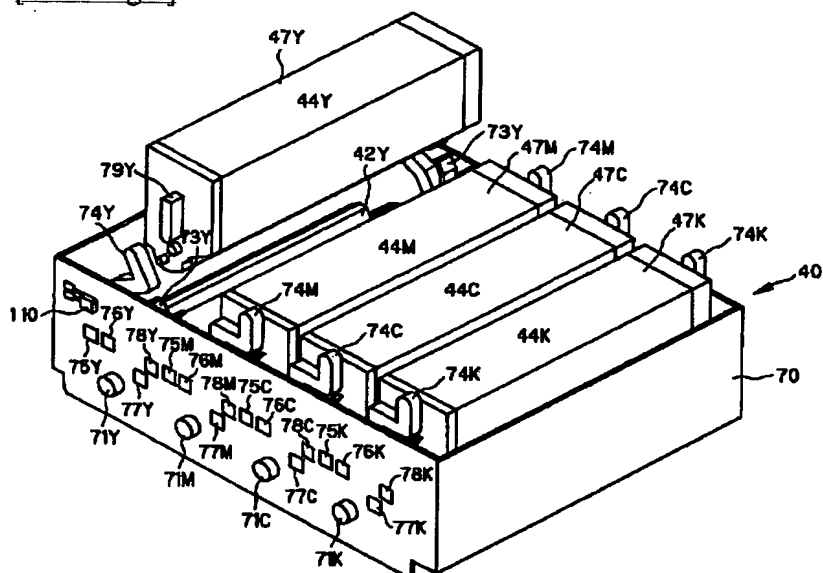
[Drawing 2]



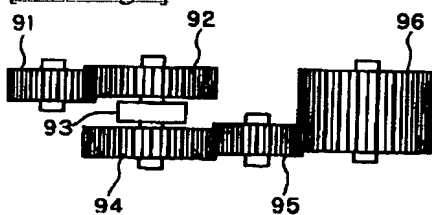
[Drawing 3]



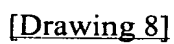
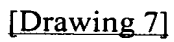
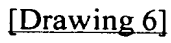
[Drawing 4]



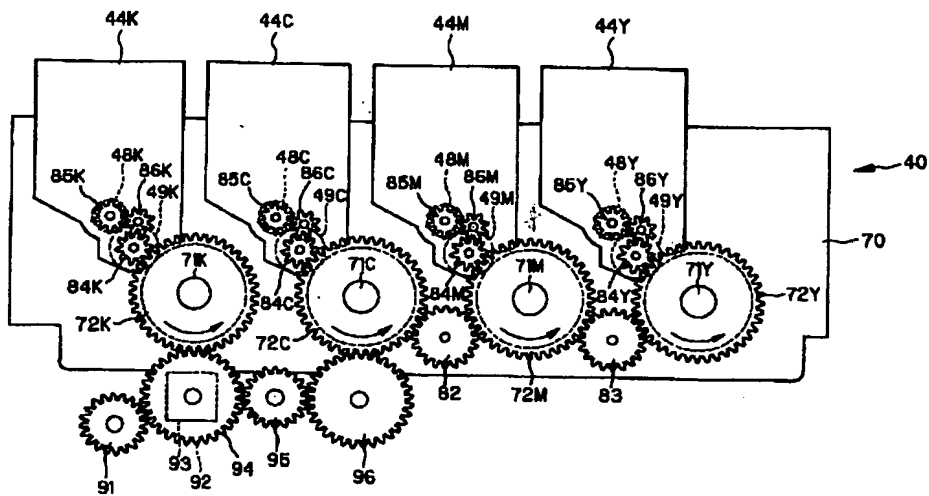
[Drawing 9]



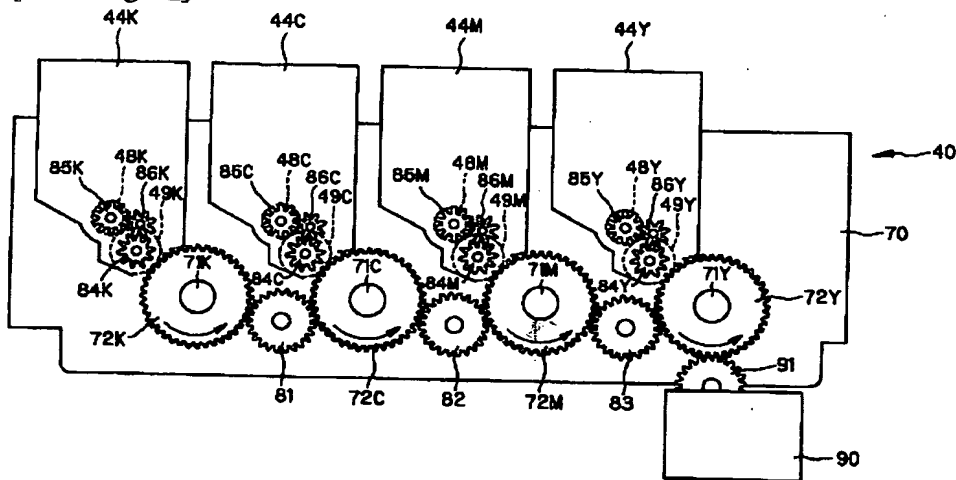
[Drawing 5]



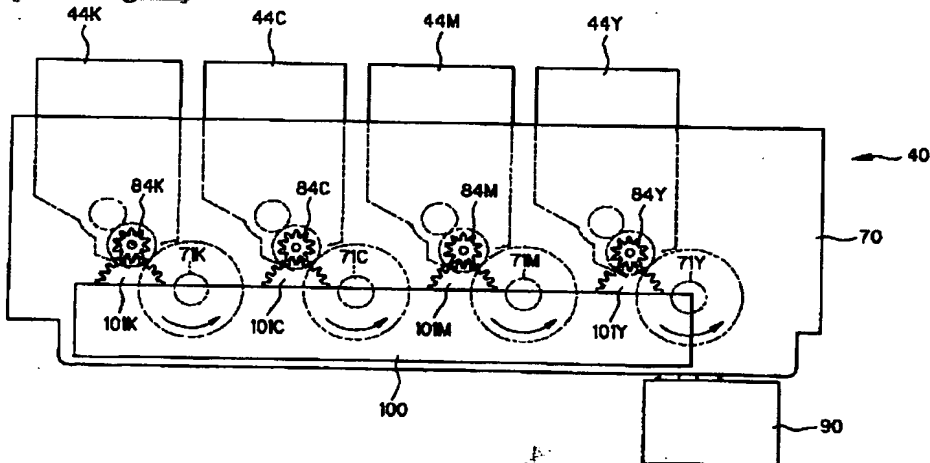




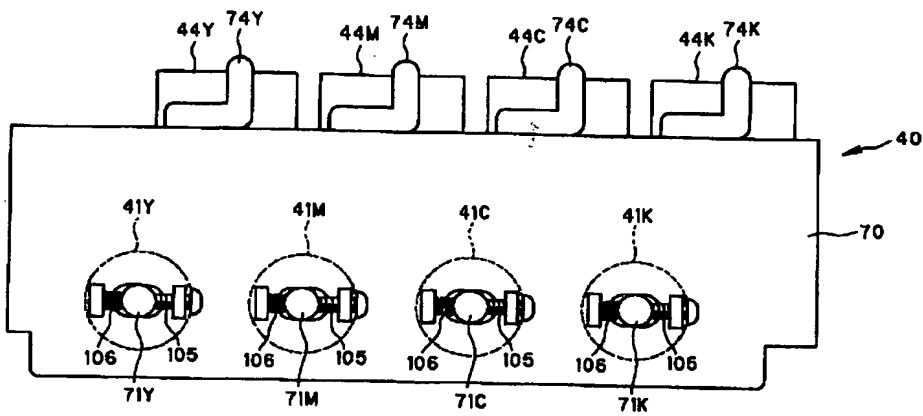
[Drawing 10]



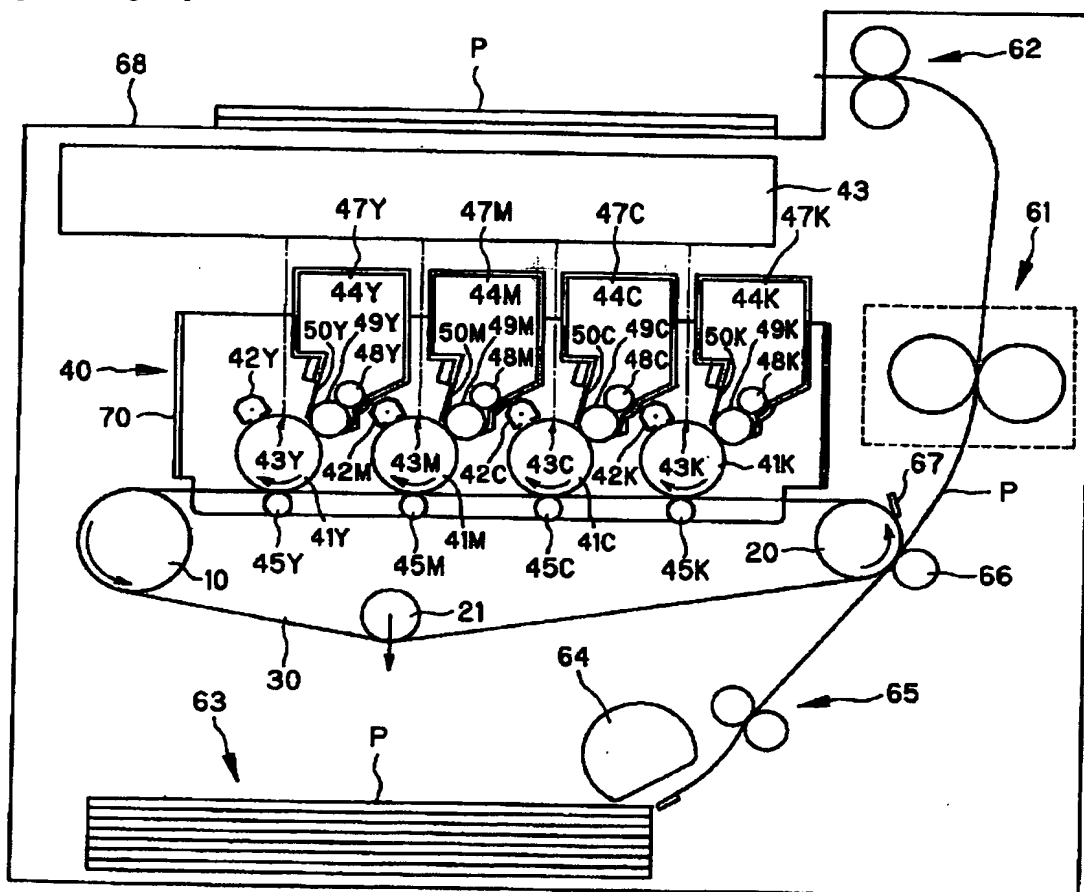
[Drawing 11]



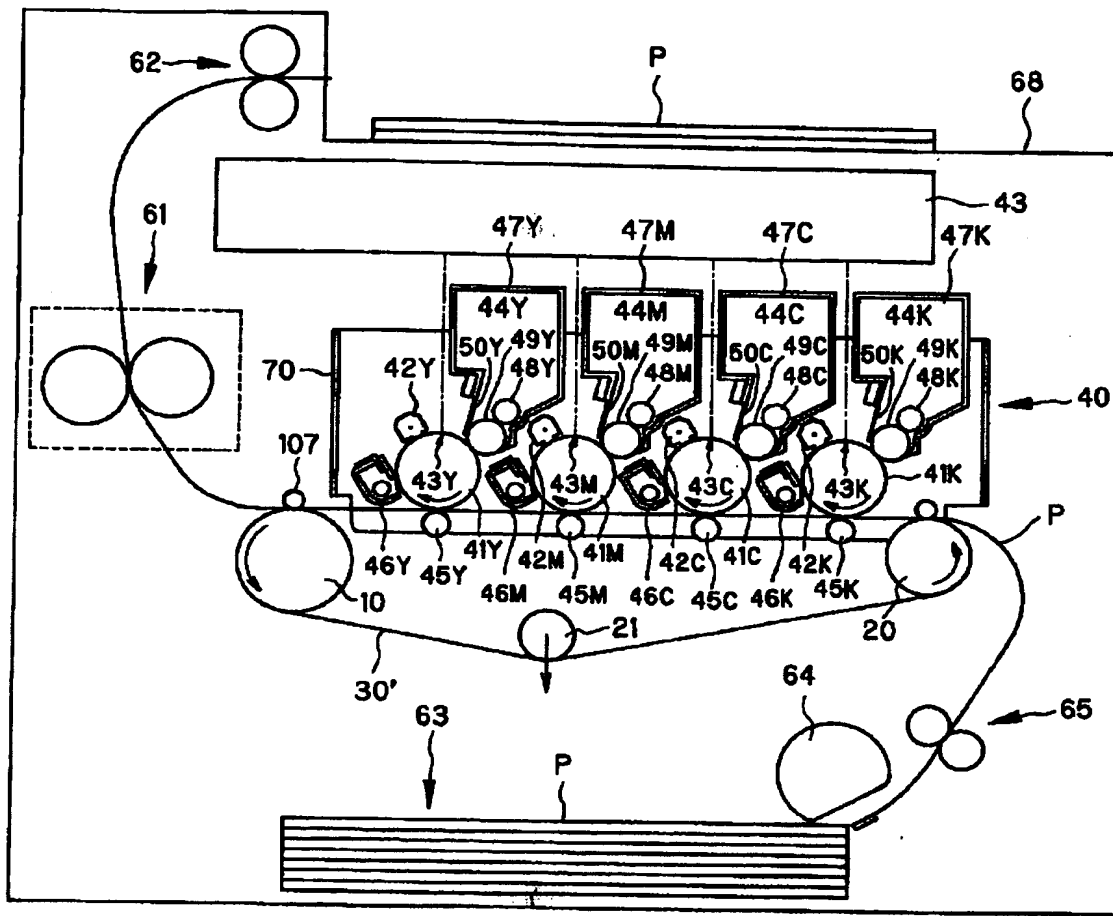
[Drawing 12]



[Drawing 13]



[Drawing 14]



[Translation done.]